

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
27 May 2004 (27.05.2004)

PCT

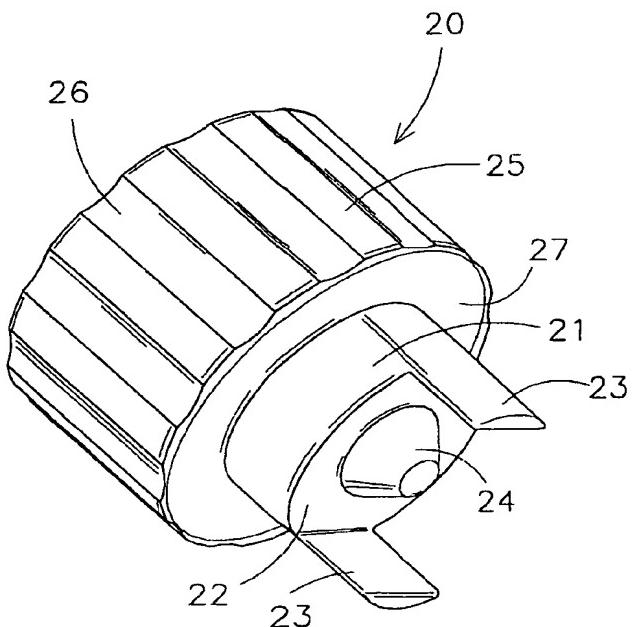
(10) International Publication Number  
**WO 2004/044440 A1**

- (51) International Patent Classification<sup>7</sup>: F16B 37/04, B25B 13/02
- (21) International Application Number: PCT/NL2003/000736
- (22) International Filing Date: 29 October 2003 (29.10.2003)
- (25) Filing Language: Dutch
- (26) Publication Language: English
- (30) Priority Data:  
1021893 11 November 2002 (11.11.2002) NL  
1022190 18 December 2002 (18.12.2002) NL
- (71) Applicant (for all designated States except US): J. VAN WALRAVEN B.V. [NL/NL]; Industrieweg 5, NL-3641 RK Mijdrecht (NL).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): VAN WALRAVEN,
- (74) Agent: HOUBEN, C., W., H., F.; Exter Polak & Charlouis B.V., P.O.Box 3241, NL-2280 GE Rijswijk (NL).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, IU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CI, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,

[Continued on next page]

(54) Title: ASSEMBLY OF A NUT BODY IN A PROFILED-SECTION ELEMENT

WO 2004/044440 A1



(57) Abstract: An assembly tool (20) for a securing system.(1) The securing system comprises an elongate profiled-section element (2) having a longitudinal slot (6), which is delimited by two flanges, and an elongate nut body (3). The nut body is of a width which is less than the width of the longitudinal slot and a length (1) which is greater than the width of the longitudinal slot. The nut body is provided with a bore (8) and, on an underside, with a downwardly projecting spring (13).

BEST AVAILABLE COPY

O 2004/044440 A1



SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*

Assembly of a nut body in a profiled-section element

The invention relates to an assembly tool for a securing system comprising:

- 5    - an elongate profiled-section element having a top side which is provided with two flanges which delimit a longitudinal slot, and which profiled-section element also has a base lying opposite the top side,
- 10   - an elongate nut body of a width which is less than the width of the longitudinal slot in the profiled-section element and a length which is greater than the width of the longitudinal slot in the profiled-section element, which nut body also has a top side, an underside and, surrounding it, two short sides and two long sides, the nut body also being provided with a bore and on 15   the underside being provided with a downwardly projecting spring.

During assembly, the longitudinal axis of the nut body is brought into line with the longitudinal slot, and the nut body 20   is introduced into the profiled-section element between the flanges with the underside facing towards the base of the profiled-section element, so that the spring engages on the base of the profiled-section element. Then, the nut body is rotated 25   in order to engage behind the flanges, with the spring pressing the nut body towards the top side of the profiled-section element and onto the flanges.

A securing system of the type described above is known, for example, from EP 0 516 321. In a securing system of this type, 30   it is known to introduce the nut body into the profiled-section element by hand. In the process, the nut body is pushed between the flanges of the profiled-section element, counter to the spring force, using one or more fingers, and then the nut body is rotated, an operation which generally requires two fingers.

35

Arranging a nut body in a profiled-section element by hand in this way is laborious and in practice causes problems on account of the frequently small size of the nut bodies used and the small slot width of the profiled-section element, with the

result that the space available for the fingers during introduction and rotation of the nut is small. One or more fingers can become trapped. The opposite force exerted by the spring also makes it more difficult to introduce and rotate the  
5 nut body.

It is an object of the invention to facilitate the mounting of the nut body in a profiled-section element in a system of this nature.

10

According to the invention, this object is achieved by an assembly tool which can be applied to the nut body, it being possible for the nut body to be introduced into the profiled-section element by means of the assembly tool, and it being  
15 possible for the assembly tool to be rotated, with the nut body rotating with it, and for the assembly tool to be removed from the nut body. This results in an assembly tool which makes the nut body easy to handle so that it can be introduced into the profiled-section element by simple operations.

20

In a preferred embodiment, the assembly tool is designed to be applied to the nut body by being fitted onto the nut body and to be removed from the nut body by being pulled off the nut body.

25

The assembly tool is preferably designed to engage in clamping fashion on the nut body. This creates a good grip for the assembly tool on the nut body, with the result that the nut body itself does not fall off the assembly tool when the nut body is hanging beneath the assembly tool.

30

In a preferred embodiment, the assembly tool comprises an engagement part for engaging on the nut body, an intermediate part connected to the engagement part, and a handling member connected to the intermediate part allowing the tool to be  
35 handled.

During assembly, the engagement part of the assembly tool is positioned on the nut. As a result of a compressive force being manually exerted on the handling member, the nut body is

- introduced into the profiled-section element. In the process, the intermediate part spans the distance between the top side of the profiled-section element and a bottom edge of the flanges. As a result of the handling member then being rotated, 5 preferably by hand, the nut body is entrained in the rotary motion by the engagement part. When the nut body is then in the assembled state, the assembly tool can be removed from the nut body.
- 10 In a further preferred embodiment, the engagement part comprises a pressure-exerting surface and at least one projection which extends from the pressure-exerting surface substantially perpendicular to the pressure-exerting surface, the pressure-exerting surface having a minimum cross-sectional dimension which is such that it is no larger than the width of 15 the longitudinal slot, and being designed to engage on the top side of the nut body during use in order to press the nut body into the profiled-section element between the flanges of the profiled-section element,
- 20 the projection being designed to engage on a long side of the nut body during use, in such a manner that a rotary movement of the handling member and the pressure-exerting surface about an axis of rotation which extends substantially perpendicular to the pressure-exerting surface results in a rotary movement of 25 the nut body,
- and the handling member being designed to be able to exert a compressive force and a rotational force on the nut body at a distance from the pressure-exerting surface.
- 30 During assembly, the pressure-exerting surface of the assembly tool is positioned on the top side of the nut, with the projection positioned along the long side of the nut body. The manual application of a compressive force to the handling member causes the nut body to be introduced into the profiled-section 35 element. Subsequent manual rotation of the handling member causes the pressure-exerting surface with the projection to be rotated so that the nut body is entrained in the rotary motion by the projection. When the nut body is then in the assembled state, the pressure-exerting surface with the projection can

easily be removed from the nut body. The result is a tool which is matched to the dimensions of the nut body and the slot width of the profiled-section element, making the nut body easy to handle and allowing it to be fitted into the profiled-section 5 element by simple operations. It is preferable for a direction indicator, for example a stripe, to be applied to the handling member, which indicator, during assembly, indicates the position of the assembly tool and the nut body with respect to the longitudinal slot in the profiled-section element.

10

In a preferred embodiment, the handling member of the assembly tool comprises a handgrip. This makes the tool easier to handle.

In a further preferred embodiment, the intermediate part 15 comprises a body with a maximum cross-sectional dimension which is smaller than the width of the longitudinal slot in the profiled-section element, the handling member being formed at one end of the body and the pressure-exerting surface being formed at the other end of the body, the pressure-exerting 20 surface being positioned substantially perpendicular with respect to the centre axis of the body. This simple design of the assembly tool is favourable since it is easy to produce.

Preferably, the handling member has a minimum cross-sectional 25 dimension which is larger than the width of the longitudinal slot in the profiled-section element, and the distance in the axial direction from the pressure-exerting surface to the handling member is at least equal to the distance between the top side of the profiled-section element and the bottom edge of 30 the flange. This has the advantage that if the nut body is pressed into the slot by the assembly tool until the handling member touches the top of the flanges, the nut body has been introduced far enough into the profiled-section element to allow it to be rotated beneath the flanges.

35

It is preferable for a protuberance to be arranged on the pressure-exerting surface, this protuberance being designed to be fitted into the bore in the nut body during use. Furthermore, the protuberance is preferably located in the centre of the

pressure-exerting surface. This makes it easy for the assembly tool to be fitted onto the nut body, with the pressure-exerting surface being positioned in an advantageous way, in particular in the longitudinal direction of the nut body.

5

In a preferred embodiment, two projections are arranged opposite one another on either side of the edge of the pressure-exerting surface in order, during use, to engage on the opposite long sides of the nut body, the distance between the outermost edges 10 of the projections being smaller than the width of the longitudinal slot of the profiled-section element. The two projections enable the tool to engage around the nut body in the width direction, resulting in a more uniform transfer of the rotational force from the assembly tool to the nut body.

15

The projections are preferably designed to engage in clamping fashion on the nut body.

The handling member, the intermediate part and the engagement 20 part are preferably formed integrally. This makes the tool more compact and more robust. It is preferably made in a single piece from plastic, which is simple and inexpensive in terms of the production technology required.

25 The invention also relates to a combination of an assembly tool and a nut body as described in claim 17. The invention also relates to a method according to claim 18.

A second aspect of the invention relates to a securing system 30 according to the preamble of claim 20.

A securing system of this type is known. If, in the known securing system, the nut body is pushed into the profiled-section element in the longitudinal direction in order to reach 35 the correct position, the free end of the spring slides over the base of the profiled-section element. Holes are often arranged in the base of the profiled-section element. The free end of the spring may then become hooked behind the edges of the holes, making assembly more difficult.

It is an object of the second aspect of the invention to overcome this problem.

This object is achieved, according to the invention, by a 5 securing system according to the preamble of claim 20 in which the spring is provided, at the end which engages on the base of the profiled-section element, with a sliding part comprising a sliding foot.

10 In the assembled state of the nut body, the sliding foot engages on the base of the profiled-section element, sliding over the base as the sliding nut is displaced, with the result that the free end of the spring can no longer become hooked behind the holes which are present therein.

15 The invention will be explained in more detail with reference to the drawing, in which:

Fig. 1 shows a perspective view of a securing system having a 20 profiled-section element and a nut body,

Fig. 2 shows a cross-sectional view through a securing system having a profiled-section element and a nut body in the assembled stated,

.25 Fig. 3 shows a perspective view of an assembly tool according to the invention,

Fig. 4 shows a perspective view during assembly of the securing 30 system shown in Fig. 1 with the aid of an assembly tool in accordance with Fig. 3,

Fig. 5 shows a perspective view of a securing system in accordance with a second aspect of the invention, having a 35 profiled-section element and a first embodiment of a nut body,

Fig. 6 shows a second embodiment of a nut body for a securing system in accordance with the second aspect of the invention,

Fig. 7 shows a perspective view of the sliding part from Fig. 6,

Fig. 8 shows a cross section through the sliding part shown in Fig. 6, and

5

Fig. 9 shows a perspective view of another embodiment of a sliding part.

Fig. 1 shows a securing system 1 which comprises an elongate  
10 profiled-section element 2 and a nut body 3.

The profiled-section element 2 has a top side 5 which is provided with two flanges 4 with inwardly bent flange edges 4a which delimit a longitudinal slot 6. The profiled-section  
15 element 2 also has a base 7 lying opposite the top side 5. The flanges 4 and the base 7 are connected by side walls 19.

The nut body 3 is provided with a bore 8 which is provided with a screw thread. The nut body 3 is of a width B which is less  
20 than the width X of the longitudinal slot 6 of the profiled-section element 2. The nut body 3 is of a length L which is greater than the width X of the longitudinal slot 6 in the profiled-section element 2. The nut body 3 has a substantially planar top side 9 and a substantially planar underside 10 and,  
25 surrounding it, two short sides 11 and two long sides 12. The nut body 3 is preferably made from a metal strip. The nut body 3 is provided, at the underside 10, with a coil spring 13 which presses the nut body 3 upwards towards the flanges 4. It is also possible to fit another type of spring. In this exemplary  
30 embodiment, the nut body 3 is provided with grooves 14. In the assembled state, the flange edges 4a are received in the grooves 14.

Fig. 2 shows a slightly different embodiment of a securing system 1, in which the nut body 3 does not have grooves 14. In this figure, the nut body 7 is in the assembled state, in which the nut body 3 is pressed onto the flange edge 4a by the spring 13 and is held fixedly in place in clamping fashion.

Fig. 3 shows a preferred embodiment of the assembly tool 20 according to the invention. In this embodiment, the assembly tool 20 comprises an intermediate part in the form of a pressure-exerting member 21. The pressure-exerting member 21 is provided at one end with a pressure-exerting surface 22. In this example, the pressure-exerting member 21 is formed cylindrical and the pressure-exerting surface 22 is formed substantially circular and is positioned substantially perpendicular to the centre axis of the cylindrical pressure-exerting member 21.

According to the invention, the pressure-exerting member may also be designed in a form other than cylindrical, for example with a polygonal cross section and with a polygonal pressure-exerting surface. The diameter of the pressure-exerting member 21 and the pressure-exerting surface 22 is smaller than the width X of the longitudinal slot 6. The pressure-exerting member 21 and the pressure-exerting surface 22 have a diameter which approximately corresponds to the width B of the nut body 3. The axial length of the pressure-exerting member 21 is at least equal to and preferably greater than the distance between the top side 5 of the profiled-section element 2 and the underside of the inwardly bent flange edge 4a. If, in an embodiment, the flange 4 does not have a bent-over flange edge 4a, the axial length is at least equal to the distance between the top side 5 of the profiled-section element 2 and the underside of the flange 4.

Two projections 23 are arranged diagonally opposite one another on the edge of the pressure-exerting surface 22. The inner diametral distance between the projections 23 is preferably such that it is at least equal to or slightly greater than the width B of the nut body 3. The diametral distance between the outermost edges of the projections 23 is less than the width X of the longitudinal slot 6 in the profiled-section element 2. Furthermore, it is preferable for a protuberance 24, which in this example is frustoconical, but may also, for example, be cylindrical or in some other form, to be arranged in the centre.

A handling knob 25 is arranged at the other end of the pressure-exerting member 21. The handling knob 25 is substantially

cylindrical, but may also be designed in some other form, for example with a polygonal cross section or in spherical form. On the outer side, the handling knob 25 is preferably provided with axial grooves 26, allowing the outer side to serve as a handgrip 5 for the tool. However, it is also possible for other features to be arranged on the handling knob so as to form a handgrip. The diameter of the handling knob 25 is in this example greater than the width X of the longitudinal slot 6, but this is not necessarily the case. As a result, the handling knob 25 has a 10 stop face 27 at the transition to the pressure-exerting member 21.

Fig. 4 shows how the assembly tool 20 is applied to the nut body 3. The protuberance 24 has been fitted into the bore 8 in the 15 nut body 3 (not shown), and the pressure-exerting surface 22 is resting on the top side 9 of the nut body 3. The projections 23 engage on the opposite long sides 12 of the nut body 3. The assembly tool 20 thereby engages around the nut body 3 in the width direction of the nut body 3. On account of the fact that 20 the protuberance 24 has been received in the bore 8, the assembly tool 20 is positioned in the centre as seen in the longitudinal direction of the nut body 3. The assembly tool 20 is therefore formed in such a manner that the nut body does not have to have any additional features to enable the tool to 25 engage thereon. As a result, the assembly tool fits onto the standard nut bodies which are commercially available at low cost. This contrasts with securing systems shown in FR 2 515 753 and DE 199 28 144, which use nut bodies which are expensive to produce. FR 2 515 753 shows a metal nut body around which a 30 plastic support ring is fitted. At the top side, the support ring is provided with a ring in which recesses are formed for an assembly tool. DE 199 28 144 shows a nut body in which an annular section is arranged on the top side. The annular section has a bore which lies in line with the bore in the nut body. 35 Furthermore, a slot is arranged on the top side of the annular body to enable a screwdriver head to be fitted into it.

During assembly, the longitudinal axis of the nut body 3, with the assembly tool 20 fitted to it, is brought into line with the

longitudinal slot 6. Then, the nut body 3 is introduced into the profiled-section element 2 between the flanges 4 as a result of the assembly worker pushing the handling knob 25 downwards. In the process, he must at a certain time overcome the resistance 5 of the spring 13, which at a certain time comes into contact with the base 7 of the profiled-section element 2 and engages thereon. Therefore, while the nut body 3 is being introduced through the longitudinal slot 6, the projections 23 are located between the nut body 3 and the flanges 4, and their outer sides 10 can slide along the flange edges 4a. When the nut body 3 has been pressed sufficiently far downwards, for example when the stop face 27 of the handling knob 25 comes into contact with the top side of the profiled-section element 2, the assembly worker can rotate the handling knob 25 through approximately 90°. As a 15 result, the nut body 3 is rotated in such a manner that it can engage behind the flange edges 4a. This situation is illustrated in Fig. 4. The spring 13 then presses the nut body 3 upwards onto the flange edges 4a, when the assembly worker is no longer pressing onto the handling knob 25.

20

Then, the assembly tool 20 can be moved upwards, so that it is pulled off the nut body 3. The nut body 3 remains behind in the profiled-section element 2 in the assembled state, as shown in Fig. 2.

25

Figs. 1, 2 and 4 show how the spring 13 engages on the base 7 of the profiled-section element 2. If the nut body 3 is displaced in the longitudinal direction in the profiled-section element 2 in order to reach the correct position, the spring 13 slides 30 over the base 7 of the profiled-section element 2. The profiled-section element 2 often has securing holes (not shown) in the base 7. The free ends of the spring 13 can then become hooked behind the edges of the securing holes, making assembly more difficult.

35

Fig. 5 shows a solution to this problem. The spring 13 is provided, at the end which engages on the base 7 of the profiled-section element 2, with a sliding part 16 which is preferably made from plastic and in this example comprises a

hollow cylinder part 18, which surrounds the bottom end of the spring 13, and a flat sliding foot 17, which closes off the hollow cylinder part 18 at the underside. The hollow cylinder part 18 can then engage in clamping fashion on the outer 5 circumference of the coil spring.

In the assembled state, the sliding foot 17 engages on the base 7 of the profiled-section element 2. The sliding foot 17 is such that it has a greater width than the smallest dimension of the 10 respective securing holes. The sliding foot 17 is in this case circular, but may also, for example, be rectangular, the sliding foot having a width which is less than the width X of the longitudinal slot 6 in the profiled-section element 2 and a length which is less than the distance between the side walls 19 15 of the profiled-section element 2. The sliding foot 17 slides without problem over the base 7, and the spring 13 cannot become hooked behind the hole edges.

The sliding foot 17 preferably has a small thickness, and the 20 wall thickness of the cylinder part 18 is preferably also small, this being favourable with a view to the possible use of the sliding part 16 in a profiled-section element of small height, i.e. with a low height of the side walls 19.

25 Fig. 6 illustrates another embodiment of a nut body 3 with a coil spring 13, which is preferably made from spring steel, and a sliding part 26, which is arranged at the free end of the spring 13 and has a sliding foot 27. Fig. 7 shows the sliding part 26, clearly showing that a protuberance 28, in this example 30 an annular protuberance, is arranged on the sliding foot 27. In this embodiment, the sliding foot 27 is designed as a circular plate. The annular protuberance 28 preferably has an external diameter which approximately corresponds to the internal diameter of the free end of the spring 13, so that the annular 35 protuberance 28 fits inside the bottom turn of the spring 13. The annular protuberance preferably fits in clamping fashion into the bottom turn of the spring 13. This is clearly apparent from the cross section shown in Fig. 8, in which the bottom turn is denoted by 13a and this turn bears taut around the annular

protuberance 28. The sliding part 26 is preferably made from plastic. The sliding foot 27 is preferably of low thickness, and the wall thickness of the annular protuberance 28 is preferably also low, which is favourable with a view to the possibility of 5 using the sliding part 26 in a profiled-section element of low height.

As an alternative to an annular protuberance, it is also possible for protuberances positioned on an imaginary circle to 10 be applied to the sliding foot (not shown), in which case the circumference around the protuberances has a diameter which approximately corresponds to the internal diameter of the free end of the coil spring.

15 Fig. 9 shows a similar embodiment of a sliding part 36 with a sliding foot 37 which is designed as a substantially rectangular plate. The annular projection 28 is also identical to the annular protuberance of the embodiment shown in Figs. 6 and 7. In this case too, the sliding foot 37 is designed with a low 20 thickness, and is also preferred with a view to use in a profiled-section element of low height.

The sliding parts 16, 26, 36 according to the invention create a simple and inexpensive solution to the problem of the spring 25 becoming hooked behind the edges of the securing holes in the profiled-section element, making it easier for the nut body with the spring to be displaced in the longitudinal direction inside the profiled-section element. The sliding parts 16, 26, 36 may, for example, be supplied separately or preassembled as part of a 30 package comprising a plurality of nut bodies 3. Preassembly of the sliding parts on the springs of the nut bodies has the additional advantage that the free ends of the springs in the package cannot become hooked into one another so that an assembly worker is not constantly having to separate the springs 35 of various nuts from one another before he can use them.

The assembly tool 20 according to the first aspect of the invention may also be supplied in a package with a plurality of nut bodies 3, which may also include sliding parts 16, 26, 36.

It should be noted that although the embodiments shown in each case show a coil spring, the invention also relates to an embodiment comprising other types of spring.

CLAIMS

1. Assembly tool for a securing system comprising:

- an elongate profiled-section element having a top side which  
5 is provided with two flanges which delimit a longitudinal slot, and which profiled-section element also has a base lying opposite the top side,
  - an elongate nut body of a width which is less than the width of the longitudinal slot in the profiled-section element  
10 and a length which is greater than the width of the longitudinal slot in the profiled-section element, which nut body also has a top side, an underside and, surrounding it, two short sides and two long sides, the nut body also being provided with a bore and on the underside being provided with a downwardly projecting  
15 spring,
- the longitudinal axis of the nut body, during assembly, being brought into line with the longitudinal slot, and the nut body being moved into the profiled-section element between the flanges, with the underside facing towards the base of profiled-  
20 section element, so that the spring engages on the base of the profiled-section element, and the nut body then being rotated in order to engage behind the flanges, with the spring pressing the nut body towards the top side of the profiled-section element and onto the flanges,
- 25 characterized in that the assembly tool can be applied to the nut body, in that the nut body can be introduced into the profiled-section element by means of the assembly tool, in that the assembly tool can rotate, with the nut body rotating with it, and in that the assembly tool can be removed from the nut  
30 body.

2. Assembly tool according to claim 1, characterized in that it is designed to be fitted to the nut body as it is being applied to the nut body and to be pulled away from the nut body  
35 as it is being removed from the nut body.

3. Assembly tool according to claim 1 or 2, characterized in that it is designed to engage in clamping manner on the nut body.

4. Assembly tool according to one of claims 1-3, characterized in that it comprises an engagement part for engaging on the nut body, an intermediate part connected to the engagement part and a handling member connected to the intermediate part allowing 5 the tool to be handled.

5. Assembly tool according to claim 4, characterized in that the engagement part comprises a pressure-exerting surface and at least one projection which extends from the pressure-exerting 10 surface substantially perpendicular to the pressure-exerting surface,

the pressure-exerting surface having a minimum cross-sectional dimension which is such that it is no larger than the width of the longitudinal slot, and being designed to engage on the top 15 side of the nut body during use in order to press the nut body into the profiled-section element between the flanges of the profiled-section element,

the projection being designed to engage on a long side of the nut body during use, in such a manner that a rotary movement of 20 the handling member and the pressure-exerting surface about an axis of rotation which extends substantially perpendicular to the pressure-exerting surface results in a rotary movement of the nut body,

and the handling member being designed to be able to exert a 25 compressive force and a rotational force on the nut body at a distance from the pressure-exerting surface.

6. Assembly tool according to claim 4 or 5, characterized in that the handling member of the assembly tool comprises a 30 handgrip.

7. Assembly tool according to claim 5, characterized in that the intermediate part comprises a body with a maximum cross-sectional dimension which is smaller than the width of the 35 longitudinal slot in the profiled-section element; the handling member being formed at one end of the body and the pressure-exerting surface being formed at the other end of the body, the pressure-exerting surface being positioned substantially perpendicular with respect to the centre axis of the body.

8. Assembly tool according to one of claims 5-7, characterized in that the handling member has a minimum cross-sectional dimension which is larger than the width of the longitudinal slot in the profiled-section element, and in that the distance  
5 in the axial direction from the pressure-exerting surface to the handling member is at least equal to the distance between the top side of the profiled-section element and the bottom edge of the flange.
- 10 9. Assembly tool according to one of claims 5-8, characterized in that the pressure-exerting surface has a cross-sectional dimension which approximately corresponds to the width of the nut body.
- 15 10. Assembly tool according to one of claims 5-9, characterized in that a protuberance is arranged on the pressure-exerting surface and is designed to be fitted into the bore in the nut body during use.
- 20 11. Assembly tool according to claim 10, characterized in that the protuberance is located in the centre of the pressure-exerting surface.
12. Assembly tool according to one of claims 5-11,  
25 characterized in that two projections are arranged opposite one another on either side of the edge of the pressure-exerting surface in order, during use, to engage on the opposite long sides of the nut body, the distance between the outermost edges of the projections being smaller than the width of the  
30 longitudinal slot of the profiled-section element.
13. Assembly tool according to claim 12, characterized in that the projections are designed to engage in clamping fashion on the nut body.
- 35 14. Assembly tool according to one of claims 4-13, characterized in that the handling member, the intermediate part and the engagement part are formed integrally.

15. Assembly tool according to one of the preceding claims, characterized in that it is made from plastic.

16. Assembly tool according to one of the preceding claims,  
5 characterized in that a direction indicator is arranged on the handling member for indicating the position of the assembly tool and the nut body with respect to the longitudinal slot in the profiled-section element during assembly.

10 17. Combination of an elongate nut body and an assembly tool according to one of the preceding claims.

18. Method for mounting an elongate nut body provided with spring means in an elongate profiled-section element,

15

- which profiled-section element has a top side which is provided with two flanges which delimit a longitudinal slot, and which profiled-section element also has a base lying opposite the top side,

20

- which nut body has a width which is less than the width of the longitudinal slot in the profiled-section element and a length which is greater than the width of the profiled-section element, which nut body also has a top side, an underside, two short sides and two long sides, the nut body being provided with a bore and on the underside also being provided with a downwardly projecting spring,

the longitudinal axis of the nut body being brought into line  
30 with the longitudinal slot, and the nut body being moved into the profiled-section element between the flanges, with its underside facing the base of the profiled-section element, so that the spring engages on the base of the profiled-section element, and then being rotated in such a manner that the nut  
35 body engages behind the flanges, the spring pressing the nut body towards the top side of the profiled-section element and onto the flanges,

characterized in that an assembly tool is fitted to the top side

of the nut body, in that the nut body is introduced into the profiled-section element with the aid of the assembly tool, in that the assembly tool is rotated so that the nut body is rotated, and in that the assembly tool is removed from the nut body by means of a pulling movement.

19. Method according to claim 18, in which use is made of an assembly tool according to one of claims 1-16.

10 20. Securing system comprising:

- an elongate profiled-section element having a top side which is provided with two flanges which delimit a longitudinal slot, and which profiled-section element also has a base lying opposite the top side,

15 - an elongate nut body of a width which is less than the width of the longitudinal slot in the profiled-section element and a length which is greater than the width of the longitudinal slot in the profiled-section element, which nut body also has a top side and on the underside is provided with a downwardly projecting spring,

20 the longitudinal axis of the nut body, during assembly, being brought into line with the longitudinal slot, and the nut body being moved into the profiled-section element between the flanges, with the underside facing towards the base of profiled-section element, so that the spring engages on the base of the profiled-section element, the nut body then being rotated in order to engage behind the flanges, with the spring pressing the nut body onto the flanges, characterized in that the spring is provided, at the end which engages on the base of the profiled-section element, with a sliding part comprising a sliding foot.

21. Securing system according to claim 20, characterized in that the base of the profiled-section element is provided with a pattern of holes, the sliding foot of the spring being wider than the smallest dimension of the holes.

22. Securing system according to claim 20 or 21, characterized in that the sliding foot is formed as a plate.

23. Securing system according to claim 22, characterized in that the sliding foot is formed as a substantially circular plate.
- 5 24. Securing system according to claim 22, characterized in that the sliding foot is formed as a substantially rectangular plate.
- 10 25. Securing system according to one of claims 20-24, characterized in that the sliding part engages in clamping fashion on the spring.
26. Securing system according to one of claims 20-25, characterized in that the spring is a coil spring.
- 15 27. Securing system according to one of claims 20-26, characterized in that the spring is made from metal, preferably spring steel.
- 20 28. Securing system according to claim 26, characterized in that a protuberance is arranged on the sliding foot, the protuberance having a maximum external dimension which approximately corresponds to the internal diameter of the free end of the coil spring.
- 25 29. Securing system according to claim 28, characterized in that the protuberance has a substantially circular periphery.
30. Securing system according to claim 29, characterized in that the protuberance is in the shape of a ring.
- 35 31. Securing system according to claim 26, characterized in that protuberances positioned on an imaginary circle are arranged on the sliding foot, the circumference around the protuberance having a diameter which approximately corresponds to the internal diameter of the free end of the coil spring.
32. Securing system according to claim 30, characterized in that the protuberance engages in clamping fashion, by means of

the outermost ring surface, on the innermost surface of the end of the coil spring.

33. Securing system according to claim 26, characterized in  
5 that a hollow cylinder part is arranged on the sliding foot, surrounding the bottom end of the spring.

34. Securing system according to one of claims 20-33, characterized in that the sliding part is made from plastic.

10

35. Nut body having a spring and a sliding part which is prefitted thereon, clearly for use in a securing system according to one of claims 20-34.

15 36. Sliding part clearly for use in a securing system according to one of claims 20-34.

37. Package which includes one or more nut bodies and one or more sliding parts as described in claim 36.

20

38. Package which includes one or more nut bodies according to claim 35.

25 39. Package according to claim 37 or 38 which also includes an assembly tool according to one of claims 1-16.

40. Package which includes a plurality of nut bodies and an assembly tool according to one of claims 1-16.

1/5

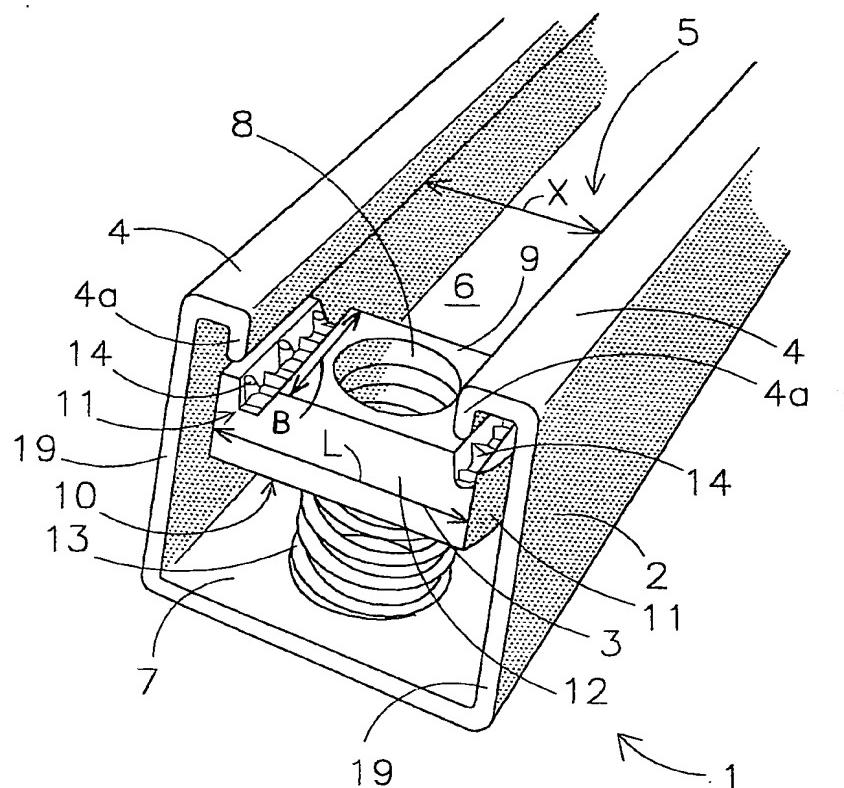


Fig. 1

2/5

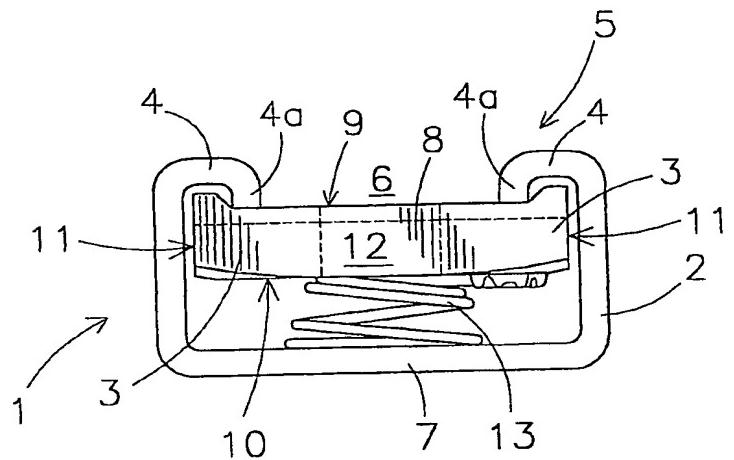


Fig 2

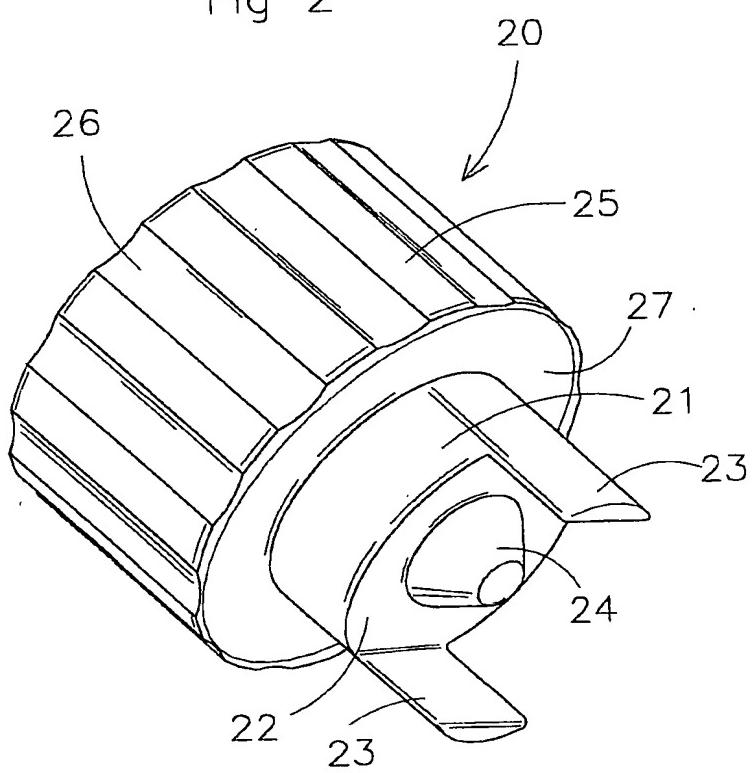


Fig 3

3/5

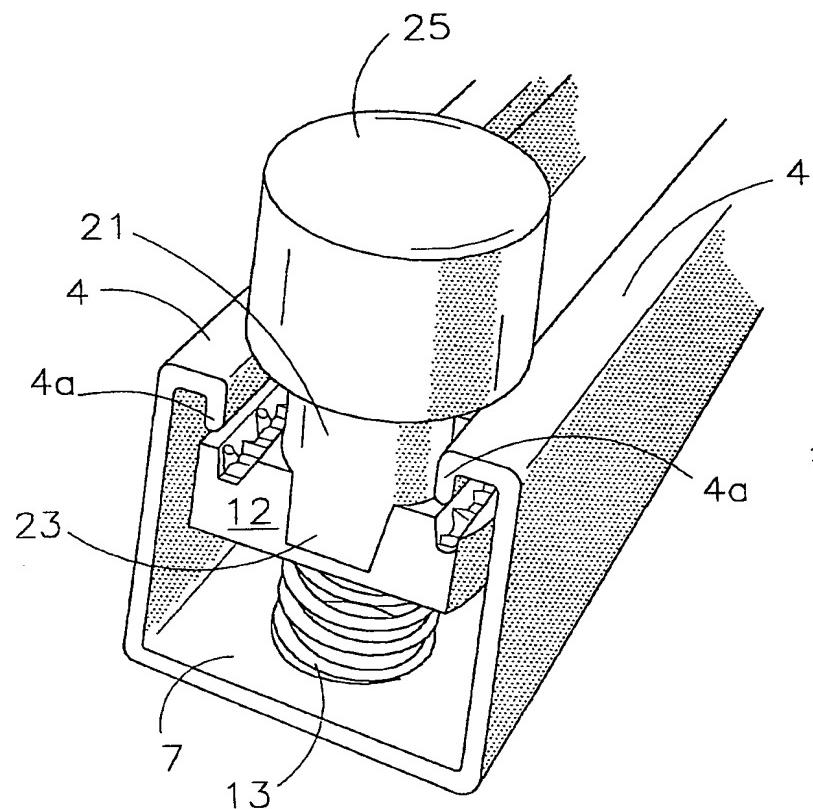


Fig 4

4/5

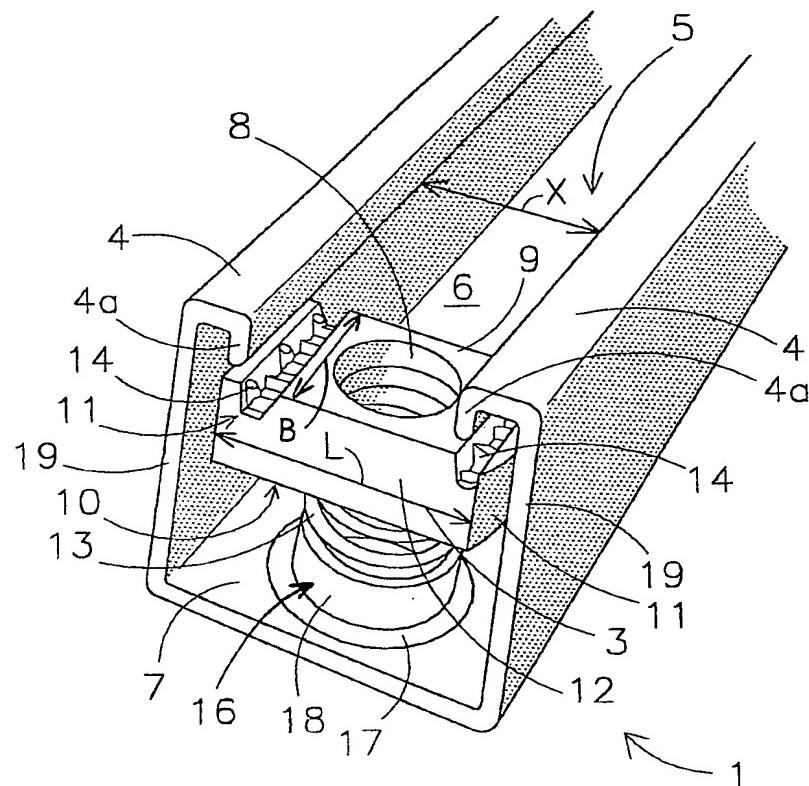


Fig 5

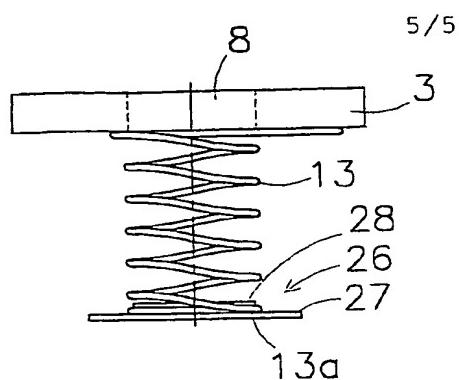


Fig. 6

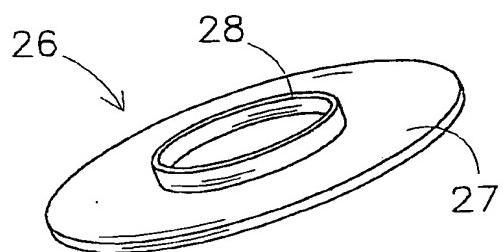


Fig. 7

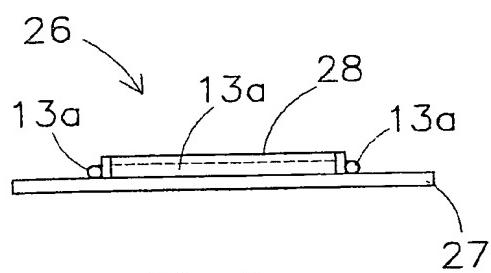


Fig. 8

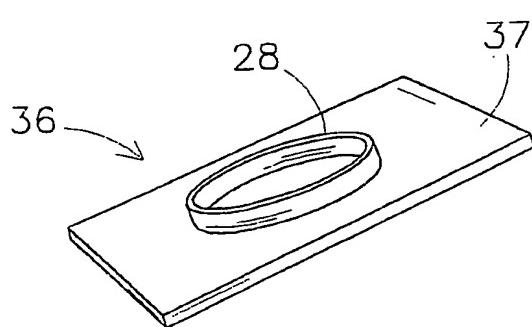


Fig. 9

# INTERNATIONAL SEARCH REPORT

Intern - Application No  
PCT/NL 03/00736

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 F16B37/04 B25B13/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 F16B B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 515 753 A (ROSE ELEKTROTECH GMBH) 6 May 1983 (1983-05-06)	1, 2, 4, 6, 14, 15, 17-20, 34-36
A	page 5, line 28 - line 35; claims; figures ---	3, 5, 37-40
X	WO 96 33349 A (OEGLAEND SYSTEM AS ;GYA ARNE (NO)) 24 October 1996 (1996-10-24)	1-6, 10, 11, 17-19
A	page 10, line 29 -page 11, line 26; claim 6; figures 8-11,13 ---	21, 37-40
X	DE 199 28 144 A (ALTRATEC MONTAGESYSTEME) 21 December 2000 (2000-12-21)	1, 2, 4, 6, 17-19
A	column 2, line 27 - line 30; figures ---	20, 26, 27, 37-40
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- 'A' document defining the general state of the art which is not considered to be of particular relevance
- 'E' earlier document but published on or after the international filing date
- 'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- 'O' document referring to an oral disclosure, use, exhibition or other means
- 'P' document published prior to the International filing date but later than the priority date claimed

- 'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- 'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- 'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- '&' document member of the same patent family

Date of the actual completion of the international search  10 February 2004	Date of mailing of the international search report  17/02/2004
Name and mailing address of the ISA  European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  Majerus, H

# INTERNATIONAL SEARCH REPORT

Application No

PCT/NL 03/00736

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 96 603 E (N. CORNOY ET AL.) 20 July 1973 (1973-07-20) figure 1 ---	1, 2, 4, 6, 17-19
X	US 2 383 573 A (TOMSEK FRANK J) 28 August 1945 (1945-08-28) page 1, left-hand column, line 53 -right-hand column, line 2; figures 1,2 ---	1, 2, 4-9, 12-14
P, X	US 2003/049094 A1 (PATRICK C. WESTLAKE) 13 March 2003 (2003-03-13) page 2, paragraph 26 - paragraph 31; figures ---	20-27, 35, 36
A	EP 0 149 128 A (GTE PROD CORP) 24 July 1985 (1985-07-24) figures 7-13 ---	20, 26, 27, 37, 38
A	EP 0 516 321 A (UNISTRUT EUROP) 2 December 1992 (1992-12-02) cited in the application figure 1 ---	20, 26, 27, 37, 38
A	GB 842 334 A (TRUSCON LTD) 27 July 1960 (1960-07-27) page 2, line 101 -page 3, line 27; figures 1-5 -----	1

## INTERNATIONAL SEARCH REPORT

Int'l application No.  
PCT/NL 03/00736

### Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

#### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-19, 39, 40 (claims 18, 19 and 39 as far as relating to claims 1-16)

Assembly tool for a securing system composed of an elongated profiled-section element and a spring-loaded nut and method of assembling

2. Claims: 18, 19, 20-34, 35-40 (claims 18 and 19 as far as relating to 20-34 and 39 as far as relating to claim 35)

Securing system composed of an elongated profiled-section element and a spring-loaded nut and method of assembling the same

## INTERNATIONAL SEARCH REPORT

PCT/NL 03/00736

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
FR 2515753	A	06-05-1983	BR CH FR	8206384 A 657428 A5 2515753 A1	27-09-1983 29-08-1986 06-05-1983
WO 9633349	A	24-10-1996	NO AU WO	951516 A 5517596 A 9633349 A1	22-10-1996 07-11-1996 24-10-1996
DE 19928144	A	21-12-2000	DE	19928144 A1	21-12-2000
FR 96603	E	20-07-1973	FR	1413191 A	08-10-1965
US 2383573	A	28-08-1945	NONE		
US 2003049094	A1	13-03-2003	NONE		
EP 0149128	A	24-07-1985	US AU AU CA DE EP IN ZA	4575295 A 570088 B2 3649484 A 1245886 A1 3462940 D1 0149128 A1 163545 A1 8409815 A	11-03-1986 03-03-1988 18-07-1985 06-12-1988 07-05-1987 24-07-1985 08-10-1988 31-07-1985
EP 0516321	A	02-12-1992	EP	0516321 A1	02-12-1992
GB 842334	A	27-07-1960	NONE		

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**